

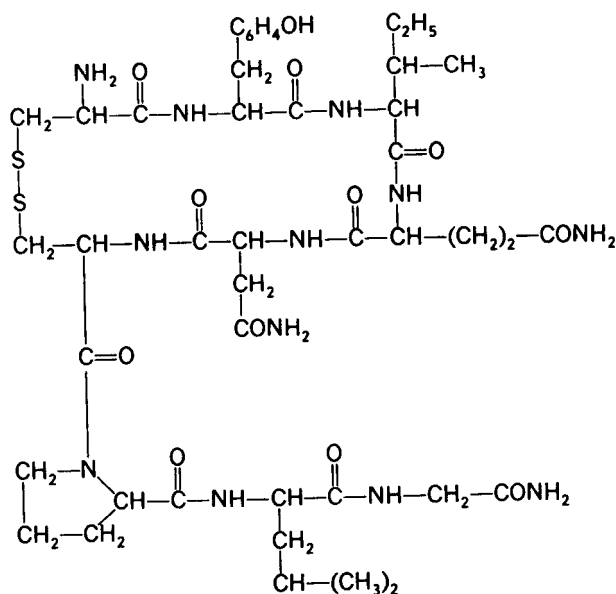
國立嘉義大學九十四學年度

生物藥學研究所碩士班招生考試試題

科目：生物化學

1. Oxytocin is one kind of important hormone. The structure of oxytocin is shown in Fig. 1. Please copy this figure in your answer sheet, mark each peptide bond by arrow symbols and write down English names and Chinese names of residues in the figure. Please make sure the reviewer can figure out the name for each residue in your answer sheet. (25%)

Fig. 1



2. John approaches the nutritional requirements in yeast for many years. He made the following two important observations in yeast culture.
- (1) No cell without mitochondria was observed in the culture.
 - (2) Peptide yeast mutants, cells with mitochondria lacking the ability of oxidative phosphorylation, can survive in the culture.

Can you make a reasonable speculation for this phenomenon? (Hints: bioenergetics and metabolic intermediate recruitment) (25%)

3. β -Purothionins are small (~5 kDa) disulfide-rich basic proteins found in the endosperm of wheat seeds. β -Purothionins form ion channels on cell membrane for its toxicity. Its amino acid sequence is:

KSCCKSTLGRNCYNLCRARGAQKLCANVCRCKLTSGLSCPKDFPK

Could you predict the effect of K and C residues on the activity of β -Purothionins? (25%)

4. Polyketides, the ubiquitous products of secondary metabolism in microorganisms, are synthesized with the polyketide synthase with two catalytic domains containing β -ketoacyl synthase, acyltransferase, acetyl/malonyl transferase, dehydratase, methyltransferase, enoyl reductase, ketoreductase, acyl carrier protein, product transfer, malonyl/palmitoyl transferase and thioesterase. Which enzyme has the similar architecture and function as polyketide synthase? Why different enzyme units should couple together for function? (25%)